

California Regional Water Quality Control Board  
North Coast Region

MONITORING AND REPORTING PROGRAM NO. R1-2003-086

FOR

PILOT STUDY FOR VOLATILE ORGANIC COMPOUND BIOREMEDIATION

WILLITS ENVIRONMENTAL REMEDIATION TRUST

Former Remco Hydraulics Facility  
934 South Main Street  
Willits, California

Mendocino County

**MONITORING**

Pre-Injection Groundwater Monitoring

1. The 8 coarse grid, 12 fine grid, and 3 contingency area groundwater monitoring wells shall be sampled prior to the injection of the food grade substances for the constituents listed in the Table 1 below.
2. The depth to groundwater shall be determined to at least 0.01 foot increments in all the coarse grid, fine grid, and contingency groundwater monitoring wells prior to injection.

Post-Injection Groundwater Monitoring

3. The depth to groundwater shall be determined to at least 0.01 foot increments in all the coarse grid, fine grid, and contingency groundwater monitoring wells weekly during the injection, every two weeks until the horizontal and vertical gradients have been established, and monthly for three months, and quarterly thereafter.
4. The groundwater-monitoring wells shall be sampled every two weeks until horizontal and vertical groundwater gradients have been established. Upon approval by the Executive Officer, groundwater monitoring may be reduced to monthly sampling for three months for the constituents listed in Table 1 below. After three monthly sampling events, the monitoring wells shall be sampled quarterly for the duration of the pilot study for the following constituents in Table 1 below. The coarse grid, fine grid, and contingency monitoring wells are depicted on Figure 3.

The eight coarse grid monitoring well clusters are identified as: MLW-5 and MLW-5-2; MLW-3-1 and MLW-3-2; MLW-6-1 and MLW-6-2; MLW-7-1 and MLW-7-2; MLW-4-1 and MLW-4-2; MLW-8-1 and MLW-8-2; MLW-10U; and MLW-11-U.

The 12 fine grid monitoring wells are identified as: FG1-1, FG1-2, FG1-3, FG1-4, FG1-5, FG1-6, FG2-1, FG2-2, FG2-3, FG2-4, FG2-5, and FG2-6.

The contingency monitoring well clusters are identified as: MLW-1-1 and MLW-1-2; MLW-2-1; MLW-9-1, MLW-9-2, and MLW-9-3.

5. Contingency Monitoring Wells MLW-1-1, MLW-1-2, MLW-2-1, M:W-9-1, MLW-9-2, and MLW-903 shall be sampled weekly for four weeks. The frequency of weekly sampling may be reduced upon concurrence by the Executive Officer based on the submitted analytical data from the weekly sampling.

The groundwater monitoring wells shall be sampled for the following constituents and the methods provided below:

TABLE 1	
Constituent	EPA Analytical Method
VOCs	Method 8260
Chlorinated Ethenes	Method 8260
Total Petroleum Hydrocarbons	Method 8015 Modified
1,4-Dioxane	Method 8270C low level
Dissolved Hydrocarbon Gases	RSK-175
Dissolved Iron, Manganese, Arsenic and Antimony	Method 6010B
Bromide and Chloride	Method 300.0
Alkalinity	Method 310.1
Nitrogen, Nitrate	Method 300.0
Sulfate	Method 300.0
Dissolved Sulfides	Method 9030
Total Organic Carbon	Method 415.1
Chemical Oxygen Demand	Method 410.4
Dissolved Organic Carbon	Method 415.1
Redox Potential, pH, Dissolved Oxygen, Temperature, Electrical Conductivity	Field Measurements

Baseline sampling for Diethylene Glycol and Oxalic Acid shall be sampled as part of the baseline sampling program, and again in six months in the following wells: MLW1-1, MLW-1-2, MLW-2-1, MLW-3-1, MLW-3-2, MLW-4-1, MLW-5-2, MLW-9-1, MLW-9-2, and MLW-9-3.

#### 6. Contingency Plan

The injection of food grade substances into the subsurface may mobilize iron, manganese, arsenic, and/or antimony. The injection of molasses may also create a temporary increase in the concentration of VOCs in the area of the injection. If these effects remain confined to the injection area, no contingency actions will be taken. However, if any of these effects are observed downgradient of the injection area, the following contingency plan will be implemented:

If groundwater monitoring results indicate an increasing trend of VOCs and metals, a trend analysis using a Mann-Kendall Test will be conducted. If an upward trend is detected at a 90 percent confidence level, and the Maximum Contaminant Level is exceeded for the constituent with the apparent upward trend, the well in which the upward trend was detected will be resampled within three days of receipt of sample results from the laboratory. The resample will be analyzed with a 48 hour turnaround time. If the results of resampling corroborate the upward trend, an effect will be considered verified and contingent action will be triggered.

An in-situ oxygenated zone will be created by injecting a dilute hydrogen peroxide solution approximately 5-feet upgradient and 5 feet downgradient of the contingency wells. Migration of any chemical constituent with the upward trend beyond the contingency well grid will be prevented by creating oxidizing conditions and thereby reversing the chemical reaction. The injection of dilute hydrogen peroxide shall be conducted within 14 days of a verified upward trend.

#### 7. Mobile Air Monitoring Program

Air monitoring shall be conducted in accordance with the following air monitoring program. Air monitoring will include mobile air monitoring stations using a hand held a photoionization detector (PID), and Colortubes® at the locations shown on Figure 4. The PID is capable of detecting volatile organic compounds at 0.5 ppm. Colortubes® are capable of detecting vinyl chloride at 0.1 ppm.

Mobile air monitoring will proceed along the perimeter of the Remco property and within the project area. The frequency of monitoring will occur as follows:

DURATION OF MONITORING	FREQUENCY
1. Background monitoring shall be conducted prior to the startup of the injection process	Daily for three days to establish background concentrations. Background sampling shall be in the morning, around mid day, and at the end of the day.
2. During injection	In the morning prior to startup of the injection, around mid day, and at the end of the work day.
2. Daily for one week after the completion of the injection process	Once per day
3. Once per week for 3 weeks after completion of No. 3 above	Once per day

If volatile organic compounds are 1 ppm (or greater) and there is no contribution from the background air monitoring station, air monitoring will continue until the levels either go down, or are consistent for a five minute period. If air monitoring levels of 1 ppm or greater are sustained for a five minute period, the injections will cease until such time as the source of the elevated levels can be identified and corrective measures are taken to address the exceedance.

### REPORTING

8. The results of the post injection monitoring, weekly, every two weeks, monthly sampling, and quarterly sampling shall be submitted 30 days following the quarterly sampling event. The monitoring report shall summarize all monitoring data collected for the in-situ treatment, and include signed laboratory reports.
9. Weekly sampling results and weekly depth to groundwater measurements of the Contingency Monitoring Wells shall be submitted within 8 days of sample collection.
10. Twenty-four hour notification shall be provided when sampling of monitoring well(s) is planned to evaluate an upward trend in the concentrations of metals, hydrogen sulfide, and/or vinyl chloride.

11. Air monitoring results from each required sampling day shall be posted no later than 9:00 a.m. the following day, in a place for public review. The posting location will be on a bulletin board in the parking lot of the Remco facility and at a location at the back entrance to the facility on Franklin Avenue. The air monitoring data for the previous day shall also be faxed by 9:00 a.m. the following day to the Regional Water Board at (707) 523-0135, the Mendocino County Air Pollution Control District Office at (707) 463-5707, and the California Department of Health Services, Environmental Health Investigations Branch at (510) 622-4505.

Ordered by \_\_\_\_\_

Catherine E. Kuhlman  
Executive Officer

September 24, 2003

(VOC Pilot M&R)